

**UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
RENTON, WASHINGTON 98055-4056**

In the matter of the petition of

**Bombardier Aerospace**

for an exemption from § 25.785(b) of  
Title 14, Code of Federal Aviation Regulations

**Regulatory Docket No. FAA-2002-11998**

**GRANT OF EXEMPTION**

By letter dated May 29, 2003, Rod Iverson, Bombardier Aerospace Completion Center Engineering, P.O. Box 11186, Tucson, Arizona 85734, petitioned for an amendment to Exemption No. 7884, previously issued on September 16, 2002. That exemption granted Bombardier certain relief from the general occupant protection requirements of Title 14 Code of Federal Regulations (14 CFR) 25.785(b) for persons occupying multiple-place side-facing seats during takeoff and landing on Bombardier Model BD100-1A10 airplanes manufactured prior to January 1, 2004. The petitioner now requests an amendment to Exemption No. 7884 to remove the limitation that restricts its applicability to airplanes manufactured prior to January 1, 2004.

**The petitioner requests relief from the following regulation:**

Section 25.785(b) requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.

**The petitioner's supportive information is as follows:**

"Background:

"FAA Exemption No. 7884 was issued for side-facing divans installed aboard the Bombardier Aerospace Model BD100-1A10 aircraft on September 16, 2002. The

exemption granted certain relief from 14 CFR 25.785(b) for occupants of multiple place side-facing seats during takeoff and landing. The side-facing divan installations are popular with our customers and a majority of the BD100 aircraft are being sold to customers with side-facing divan assemblies.

“The issue:

“The Exemption No. 7884 granted to Bombardier for 16G side-facing divans applies to BD100-1A10 airplanes manufactured prior to January 1, 2004. The end date of the limitation is rapidly approaching.

“Bombardier’s 7884 amendment request:

“Bombardier requests that the FAA approve an amendment to 7884 that deletes all reference to an exemption limitation date and specifically January 1, 2004. All other aspects of FAA Exemption number 7884 shall remain in affect for BD100-1A10 aircraft side facing divans.”

Bombardier Aerospace Group is a major international corporation, which provides business aircraft to an international market. They manufacture principally in Canada and in the U.S.A. and employ a large staff in both countries. The Bombardier aircraft are equipped with avionics and other specialized systems and equipment. With the growing numbers of Transport Category corporate aircraft predicted and the stabilizing effect their manufacture and support has on the job market, it is definitely in the public interest of both countries.

“To expedite approval of the exemption amendment we respectfully request that the FAA consider waiving the *Federal Register* comment period.”

**The FAA’s finding concerning notice and public comment is as follows:**

A summary of the petition was published in the Federal Register on July 15, 2003 (68 FR 41856). No comments were received.

**The FAA’s analysis/summary is as follows:**

Exemption No. 7884 was granted to Bombardier Aerospace with a limitation that restricted its applicability to airplanes manufactured before January 1, 2004. The petitioner has requested that this limitation be removed.

Side-facing seats are considered a novel design for transport category airplanes that include Amendment 25-64 in their certification bases, and were not considered when those airworthiness standards were promulgated. Hence, the existing regulations do not provide adequate or appropriate safety standards for occupants of multiple-place side-facing seats. The FAA has been conducting research to develop an acceptable method of compliance with § 25.785(b) for multiple-place side-facing seat installations. Without an

acceptable method of compliance available, the FAA finds that it is in the public interest to grant an exemption to the petitioner for Bombardier Model BD100-1A10 airplanes. Note that this public interest argument does not justify granting exemptions once an acceptable method of compliance with § 25.785(b) is developed. As a result, it is the intent of the FAA to not grant similar exemptions once an acceptable method of compliance is developed.

In consideration of the foregoing, I find that an amendment to Exemption No. 7884 is in the public interest and will not affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator, Bombardier Aerospace is hereby granted an amendment to Exemption No. 7884 to remove the limitation that restricts its applicability to airplanes manufactured before January 1, 2004. This exemption is applicable to Bombardier Aerospace BD100-1A10 airplanes. All other limitations of Exemption No. 7884 apply to this exemption. These limitations are provided below.

1. Existing Criteria: All injury protection criteria of §§ 25.562(c)(1) through (c)(6) apply to the occupants of side-facing seating. The HIC assessments are only required for head contact with the seat and/or adjacent structures.
2. Body-to-Body Contact: Contact between the head, pelvis, or shoulder area of one Anthropomorphic Test Dummy (ATD) with the adjacent seated ATDs is not allowed during the tests conducted in accordance with §§ 25.562(b)(1) and (b)(2). Any contact between adjacent ATDs is acceptable during rebound.
3. Body-to-Wall/Furnishing Contact: If the side-facing divan is installed aft of a structure, such as an interior wall or furnishing, that would contact the pelvis, upper arm, chest, or head of an occupant seated next to the structure, then a conservative representation of the structure and its stiffness must be included in the tests. In most cases, the representation of the structure would be more rigid and have less deflection under load than the actual installation on the airplanes. The contact surface of this structure must be covered with at least 2 inches of energy absorbing protective foam, such as ensolite. However, if the test was conducted without the 2-inch padding and met the TTI, lateral pelvic acceleration, and HIC requirements, and the applicant demonstrated that the contact surface was homogeneous, the 2-inch padding requirement for contact surfaces installed forward of the side-facing seat could be eliminated.
4. Thoracic Trauma: Thoracic Trauma Index (TTI) injury criteria measurements must be less than 85, as defined in 49 CFR part 572, subpart F. TTI data must be processed as defined in Federal Motor Vehicle Safety Standard (FMVSS), part 571.214, section S6.13.5. Should torso contact of an occupant at the forward most seat place occur during testing, TTI must be substantiated by dynamic test or rational analysis based upon previous testing of a similar design/installation. If it can be shown from known occupant movement data that the torso of an occupant at the forward most seat place will not be contacted in conditions up to the maximum

test load, a TTI measurement is not required based on this absence of torso contact. This requirement is applicable to the forward most seat place of each individual seat module. Torso contact during rebound is acceptable and need not be measured.

5. Pelvis: Lateral pelvic acceleration for all side-facing occupants must be substantiated if there is pelvic contact during testing. Should occupant pelvic contact occur, lateral pelvic acceleration must be substantiated by dynamic test or rational analysis based on previous dynamic testing of a similar design/installation. When conducting an actual test to obtain a lateral pelvic acceleration value, an appropriate test device capable of recording such a value should be used. Pelvic acceleration data must be processed as defined in Federal Motor Vehicle Safety Standard (FMVSS) Part 571.214, Section S6.13.5. Pelvic lateral acceleration must not exceed 130g.
6. Shoulder Strap Loads: Where upper torso straps (shoulder straps) are used for sofa occupants, the tension loads in individual straps must not exceed 1,750 pounds. If dual straps are used for restraining the upper torso, the total strap tension loads must not exceed 2,000 pounds.
7. Seat Positions: All seat positions need to be occupied by ATDs for the longitudinal tests.
8. Occupant Retention: All side-facing seats require end closures or other means to prevent the occupant from moving laterally off the end of the seat.
9. Longitudinal Tests: For the longitudinal tests conducted in accordance with the conditions specified in § 25.562(b)(2), a minimum number of tests will be required as follows:
  - a. One test will be required with ATDs in all positions, with undeformed floor and with all lateral supports (armrests/walls). Zero degrees of yaw must be used for establishing an OME. Zero or 10 degrees of yaw must be induced to yield critical occupant contact with the component(s) being evaluated for occupant protection. For configurations with a wall or bulkhead immediately forward of the forward seat position of the divan, a SID or equivalent ATD must be used in the forward seat position and a Hybrid II ATD(s) or equivalent must be used for all other seat locations. This is the case when lateral supports are within the OME. For configurations without a wall or bulkhead immediately forward of the forward seat, Hybrid II ATDs or equivalent must be used in all seat locations.

- b. One test will be required with Hybrid II ATDs or equivalent in all positions, with deformed floor, 10 degrees yaw, and with all lateral supports (armrests/walls). This could be considered the structural test as well.
10. Vertical Test: One test will be required, which is conducted in accordance with the conditions specified in § 25.562(b)(1). Hybrid II ATDs or equivalent must be used in all seat positions.

Issued in Renton Washington, on September 2, 2003.

/s/ Kalene C. Yanamura  
Kalene C. Yanamura  
Acting Manager  
Transport Airplane Directorate  
Aircraft Certification Service